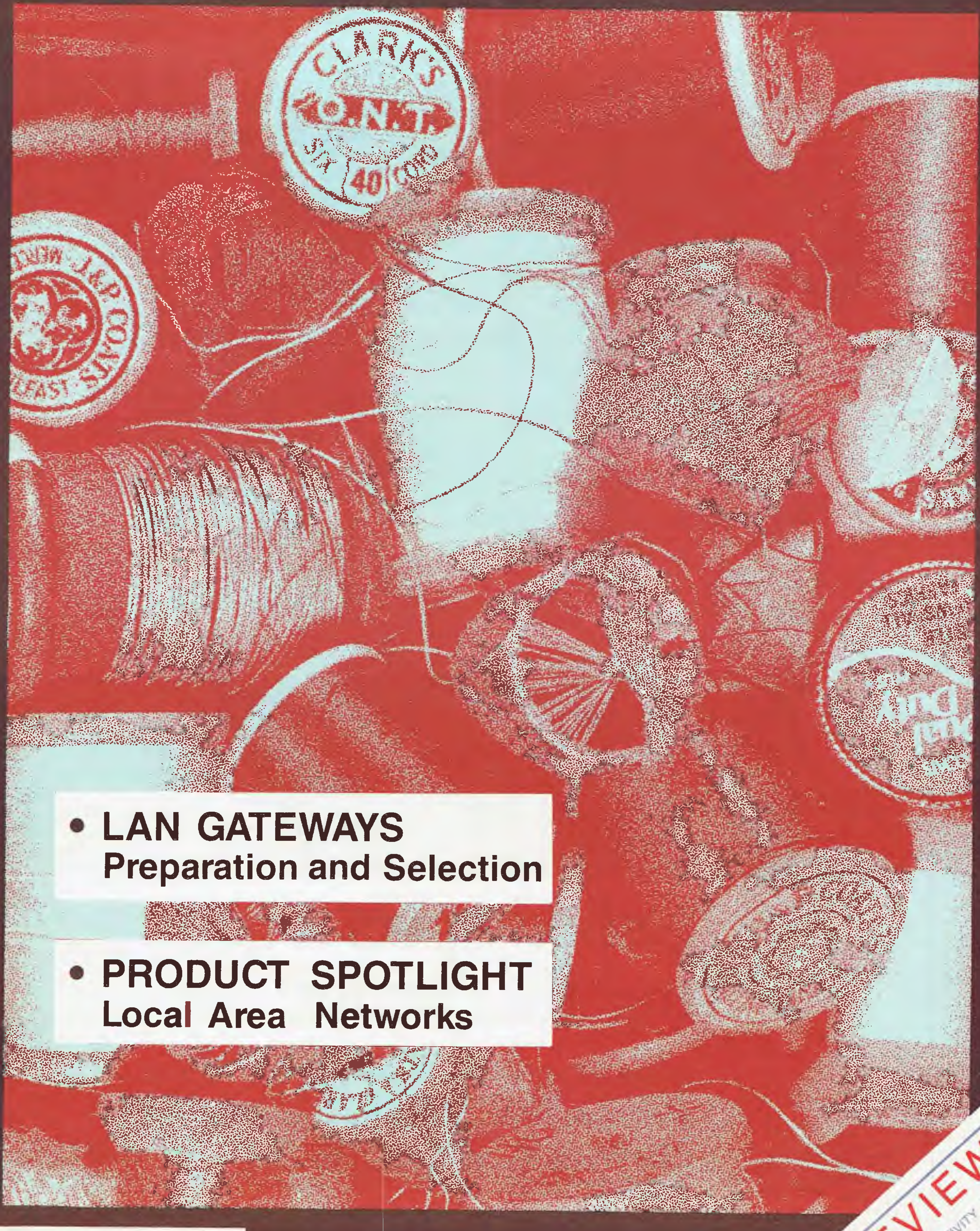
CONNECTIVITY

October 2, 1987



- **LAN GATEWAYS**
  Preparation and Selection

- **PRODUCT SPOTLIGHT**
  Local Area Networks

PREVIEW
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SYDNEY, OCTOBER 19-21

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A PUBLICATION OF COMPUTERWORLD

Good words on gateways

Mervin Adrian opens the door to accurate decisions when buying Lan Gateways

WHILE local-area network gateways have been around for quite a while, their sales curve began increasing steeply in the past year or so as mainframe-based shops began installing Lans in large numbers. Like any new technology, Lan gateways impose several tasks on the information systems professional, such as a new set of technical concepts to master, specifications to understand and products to compare.

In the case of gateways, there are a number of issues one could address to make an accurate decision.

■ Number of users to be supported. Do not skimp on this; it is a lot harder to add capacity later on to a Lan because there are fixed sizes associated with the products you buy. Although only one connection might be needed to add sessions, that connection might be a direct line to your front-end process, and it might be in short supply.

Connections to cluster controllers may be easier, assuming that there are ports there. Include in your capacity planning any printer sessions you might need, because they are also logical units and will be counted just as are terminal sessions.

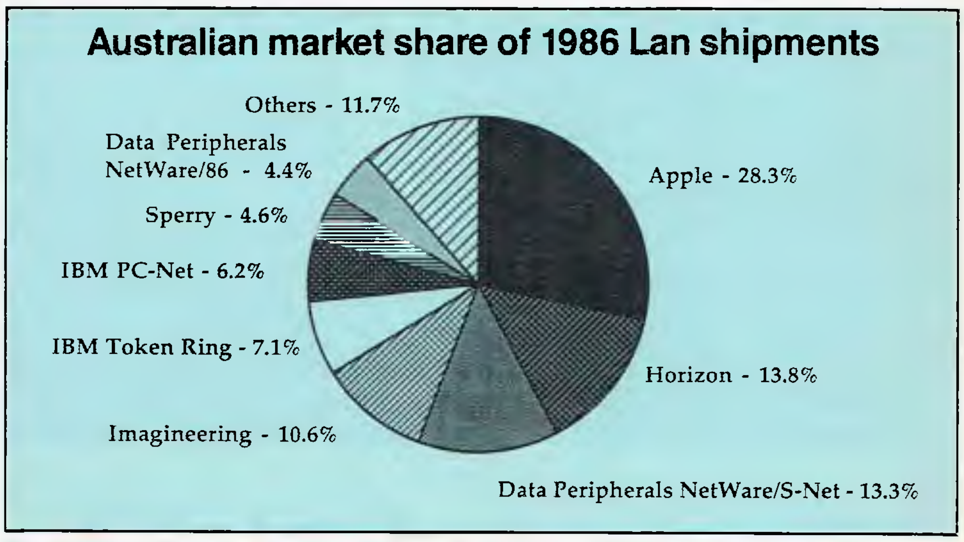
■ Number of sessions assigned to users. There are two basic approaches to this: contention and assignment. In a contention-based system, there is a pool of sessions available on a first come, first served basis.

In an assignment system, sessions are dedicated to specific users. The latter is important for printers and terminals that will run production jobs. Some products support both approaches.

■ Predicted growth and usage rate of the mainframe network. Many personal computer-based shops, even those that perform a large amount of mainframe work via terminal emulation, typically call someone and ask: "Can you run a line to this desk for us to hook up?" You must be better informed than that. You need to decide how flexible your environment is going to be and what your margin of error is.

■ Estimated cost of additional users. Say you are attaching the network to a cluster controller that is approaching maximum capacity. How easy will it be to add another controller? Are there lines to run back to

(Continued page 4)


Australian market share of 1986 Lan shipments

■ *Apple took the biggest slice of the Australian market in local area networks last year, with more than twice the percentage of its nearest rival. Source: IDC Australia.*

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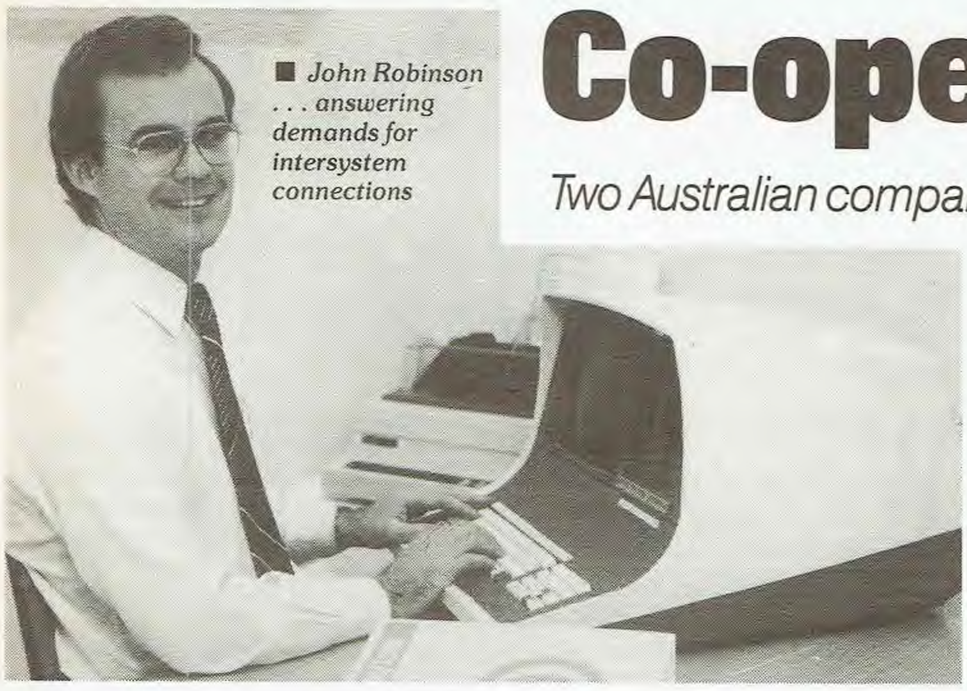

■ *John Robinson . . . answering demands for intersystem connections*

Co-operation narrows

Two Australian companies have made progress towards simplifying the links

IN the early 1960s, much pioneering work was being done in timesharing and for many years after this was the basic form of connectivity. The concept was simple — a large number of terminal devices accessing large hosts.

Connectivity is no longer such a simple undertaking. Its increasing complexity has been driven by the arrival of the ubiquitous personal computer and the demanding requirement for "instant" information.

The need for rapid communications, say in banking, has been propelled by the existence of the technology itself, and continuing with banks, by the emergence of worldwide specialist networks such as Swift.

But the need for faster dispersal, acquisition and processing of information is never satisfied. The appetite is insatiable. And in this mix of communications and computer equipment, it is now the communications dog which wags the computer equipment tail. Computers are things connected to one end of a communications line.

Connectivity is now a Pandora's Box of different machine architectures, protocols,

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Network gateways

(Continued from page 3)

the host? Will there be ports available when you get there? These are questions you should ask.

■ User expertise and the level of local support. A related issue is how much user support the gateway provides. Even in the case of gateways that provide good information at the workstation, users need to be educated to interpret screen messages and also need a knowledgeable lead operator on call for specific questions.

■ Administration utilities. How much does the system tell you about what is going on? Can you see exactly which logical units are in use? Can you see the quality of the lines and the location of active session? The absence of this kind of data, which is essential for diagnostics and monitoring, can be good reason to avoid an otherwise excellent product.

■ Using a dedicated machine as a communications server. Some gateways require the use of a dedicated machine, which avoids potential bottleneck problems (especially if that machine is a garden-variety PC).

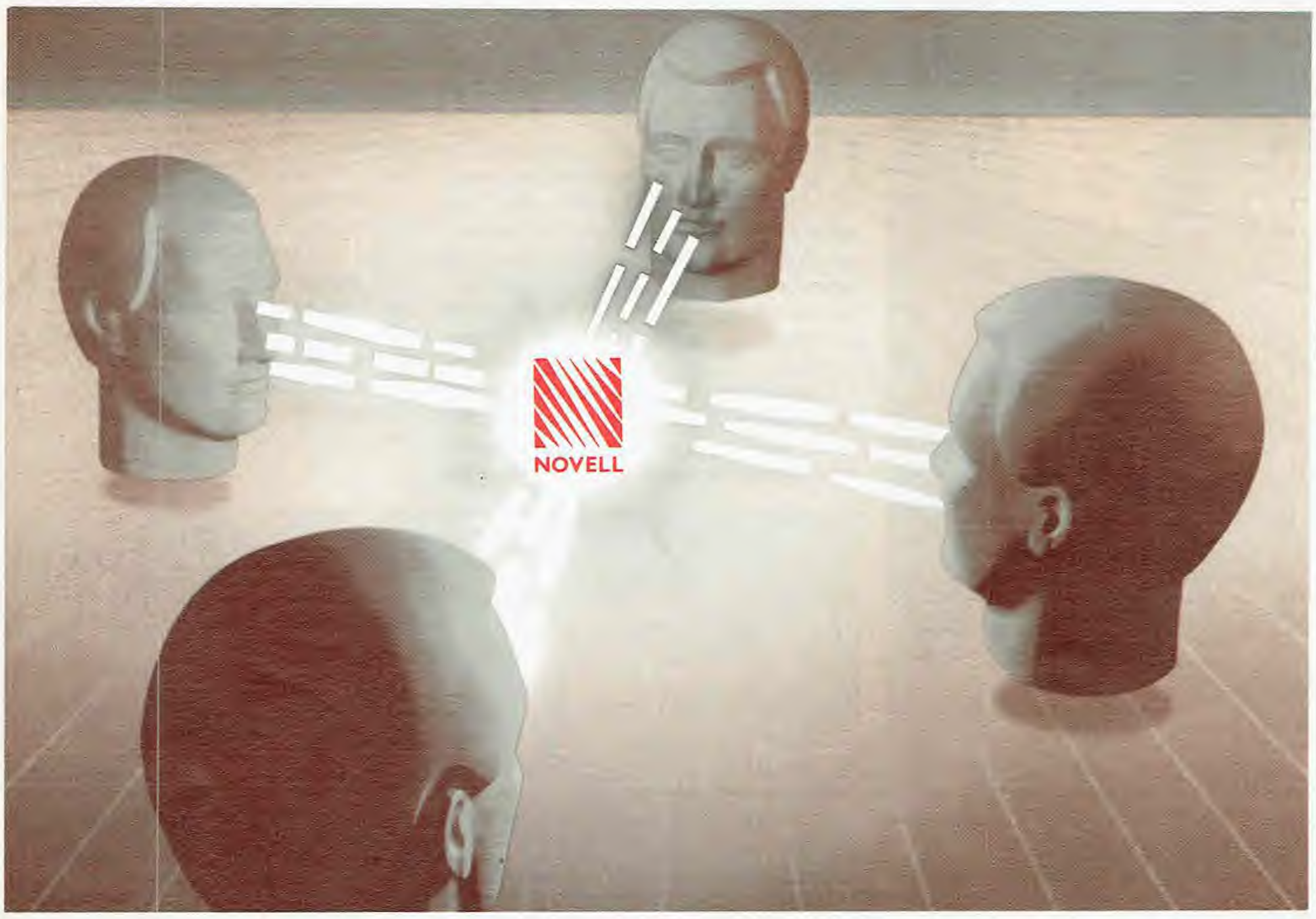
But be careful. Broadcasts that lock up workstations can do the same to a communications server, unless the machine is set to reject such broadcasts.

■ Gateway support for multiple bridged networks. You should ensure that users on one network can establish sessions on a host connected to a gateway on another network. Otherwise you will have to put a gateway in every Lan.

■ Cost considerations of providing backup hardware and lines. If you are using an IBM Synchronous Data Link Control-based gateway, you have a single point of very high vulnerability. It is critical to know how good the vendor's support will be. Alternate strategies include using a redundant piece of hardware for backup, a second line or a standby dialup connection. One or more of these is a good investment.

■ Test and test and then test again. Different factors come into play with each application. Consider the combination of products and combination of keystrokes that will be involved. It can be fatal if applications want the same keystroke the gateway needs for some control function and you cannot remap.

● *Mervin Adrian is chairman of the micro-to-mainframe Special Interest Group of the New York PC Users Group. He is also a senior programmer/analyst at Shearson Lehman Brothers.*



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the connectivity gap

between systems. Noel Bennett looks at the products and the players

applications with the consequence that these disparate mechanisms can make networking an expensive, intricate, time consuming and "tricky" operation to engineer.

Hence the growing emphasis on standards, such Open Systems Interconnect, where the goal is to facilitate the connection of different makes and models of machines.

The complexity of the mix is illustrated by mainframe to mainframe connectivity, micro to mainframe linkages and ties between personal computers. "Wiring" can be as messy as a plate of spaghetti.

While computing is increasingly being recognised as a business competitive tool, management is increasingly concerned with its cost — particularly the staff component. There is also concern about the hardware and related software aspects — even though the cost of Mips and memory is falling dramatically, greater connectivity needs the power of the host to be increased accordingly. But the staff element in the overall computing budget is the frustrating element, mainly because of the shortage of skilled personnel and their fast turnover — it is a labor seller's market. This uncertainty can not only lead to budget overruns, but more importantly, with information increasingly the life blood of a modern corporation, the blunting of the competitive edge.

When executives buy a car, they do not have to arrange for an engine to be put into the empty engine department.

Are they stupid?

As applied to networking this analogy may be absurdly simple and can be easily destroyed by the example of how difficult it is to use various packages on the humble personal computer.

Are these executives really stupid in their expectations? Or are the computer and communications industries stupid in their expectations — that they can deliver incompatible products and let buyers work it out for themselves?

Alert suppliers, including the formerly aloof IBM, are becoming increasingly aware that ease of connection between the varied mix of computing equipment is a requisite for market penetration. The one stop solution is now in demand — rather a company having to interconnect individual spaghetti strands.

Of the many Australian companies aiming at simple connectivity two may be selected to indicate progress in this field. Some years ago, John Robinson was working for what was then Bank of New South Wales and Paul Wood for IBM Australia. Robinson formed Software Developments and Wood formed Systems Technology, which subsequently expanded to the US and is now based in Raleigh, North Carolina with the title of Netlink Inc. Both entrepreneurs have remained close, and have brought together their separate products.

As an indication of their worth, Software Developments products are being marketed outside Australia by the large US software house, Cincom, and Netlink has recently formed a marketing agreement with Tandem.

The companies have co-operated by bringing together Netlink's Interhost SNAHub, a hardware product, and an associated software support product, Inter-Net/Master Connection (INMC) from Software Developments.

The companies say the hub is designed to achieve host-to-host interconnection between SNA (and FNA) networks to support data and file exchange — even between non-compatible multihost networks — in a simplified manner.

The Interhost SNAHub uses the Netlink SNAHub to establish links between otherwise unconnected SNA networks, such as when companies need to communicate with business partners.

In turn, Software Developments has developed software support for the Interhost SNAHub to enable independent Net/Master managed networks to be connected. Inter-Net/Master Connection (INMC) is a support product for systems running with Net/Master.

Software Developments says both the standard INMC feature, as supplied in the Net/Master base product and which provides a single link between two systems, and the optional INMC (Extended Function), a product providing up to eight concurrent sessions in each direction, are supported by the Interhost SNAHub.

Robinson said networking and connectivity are now the key issues in computing and the new product will answer the demands of large organisations by providing

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Terminals to workstations

A PRIVATELY held Californian networking company has introduced a microprocessor-based system designed to provide Microsoft MS-Dos applications to as many as 100 Ascii terminals while retaining their terminal functions.

The Centaur II mainframe, unveiled by Data Voice Solutions, uses up to 100 NEC V40 application processors — compatible with the Intel Corp 8MHz 8086 — to provide Ascii terminal users with applications designed for the Microsoft operating system, such as Lotus 1-2-3.

Supporting most Ascii terminals through Novell's Netware operating system or through a private branch exchange (PBX), the product can also be linked to a variety of minicomputers and IBM mainframes. The system centralises microcomputer functions at the host level while retaining compatibility with MS-Dos, according to a Data Voice spokesman.

Currently, corporate users who access minicomputer and mainframe applications through Ascii terminals are forced to buy microcomputers if they want MS-Dos compatibility. Centaur II eliminates this need by turning users' terminals into workstations that run MS-Dos-compatible software. Conversely, users retain connectivity to their host system.

Terminals attached to the system use the applications processors to run MS-Dos programs. They can be wired directly to the processors on a one-to-one basis using standard telephone wiring, a data switch or voice/data PBXs.

It also allows IBM's Personal Computers and Personal System/2s to be connected as online workstations using Novell-compatible interface hardware.

New perspectives on

Connectivity heralds a new age in computer awareness — the future will be full of change according to Larry DeBoever

DURING a visit to London for an International Connectivity Symposium, Larry DeBoever, who is a keynote speaker at the Sydney International Connectivity Symposium, October 19-21, answered a series of questions on the subject of connectivity.

The following is an edited version of his answers:

■ What is "connectivity"?

"Connectivity" is used as a catch-all phrase for interprocessor communication. It includes software, hardware, user applications, modems, Lans, micro/mainframe links, data PBXs, terminal networks, electronic mail, distributed database and dozens of other products and technologies. Clearly, "connectivity" means very different things to different people.

On the other hand you have the end-user who is always coming around a MIS with a copy of *PC Week* under his arm which has four or five yellow "post-its". To him connectivity is here today except in his company because MIS has its head in the sand. Then there is the SNA network manager to whom connectivity means 3000 terminals with requirements for subsecond response time under the heaviest load.

■ Is there any way to better define it?

I like to separate "connectivity" into physical connectivity and logical connectivity. I use physical connectivity to mean products which physical interconnect processors — such as Lans, Irma-boards and the like. I use logical connectivity to refer to the software which manages the transfer of information and with which the user interfaces — such as MMLs and communication servers.

■ Where is the industry with regard to physical and logical connectivity?

The technologies and products of physical connectivity are much more advanced than the logical connectivity products, perhaps by as much as three to five years. There are numerous hardware technologies which we cannot yet fully exploit due to lack of software such as Lans, channel connections, and the like. I want to point out that this is the natural state of things. Hardware almost always leads to software development. Look, for example, at the status of MS-Dos versus the status of 386-based PCs.

■ What do you think are the most important emerging trends for connectivity?

At the top of the list must be the emergence of peer-to-peer protocols, but in particular LU 6.2 and OSI reference models. At the same time TCP/IP, which I consider to be a real dinosaur, continues to grow. Because it's there and OSI is not. The immediate need for peer-to-peer applications has been in manufacturing and engineering functions. These systems are built on Lans and your choices are pretty limited. TCP/IP works. It is available on every system you can think of.

■ But what about LU 6.2 and OSI?

They are the future

■ But which one will win?

Both will win. I don't believe they really compete with each other. LU 6.2 is intended primarily for interconnecting user nodes in an SNA network which is, typically, lease line based. OSI is intended to inter-

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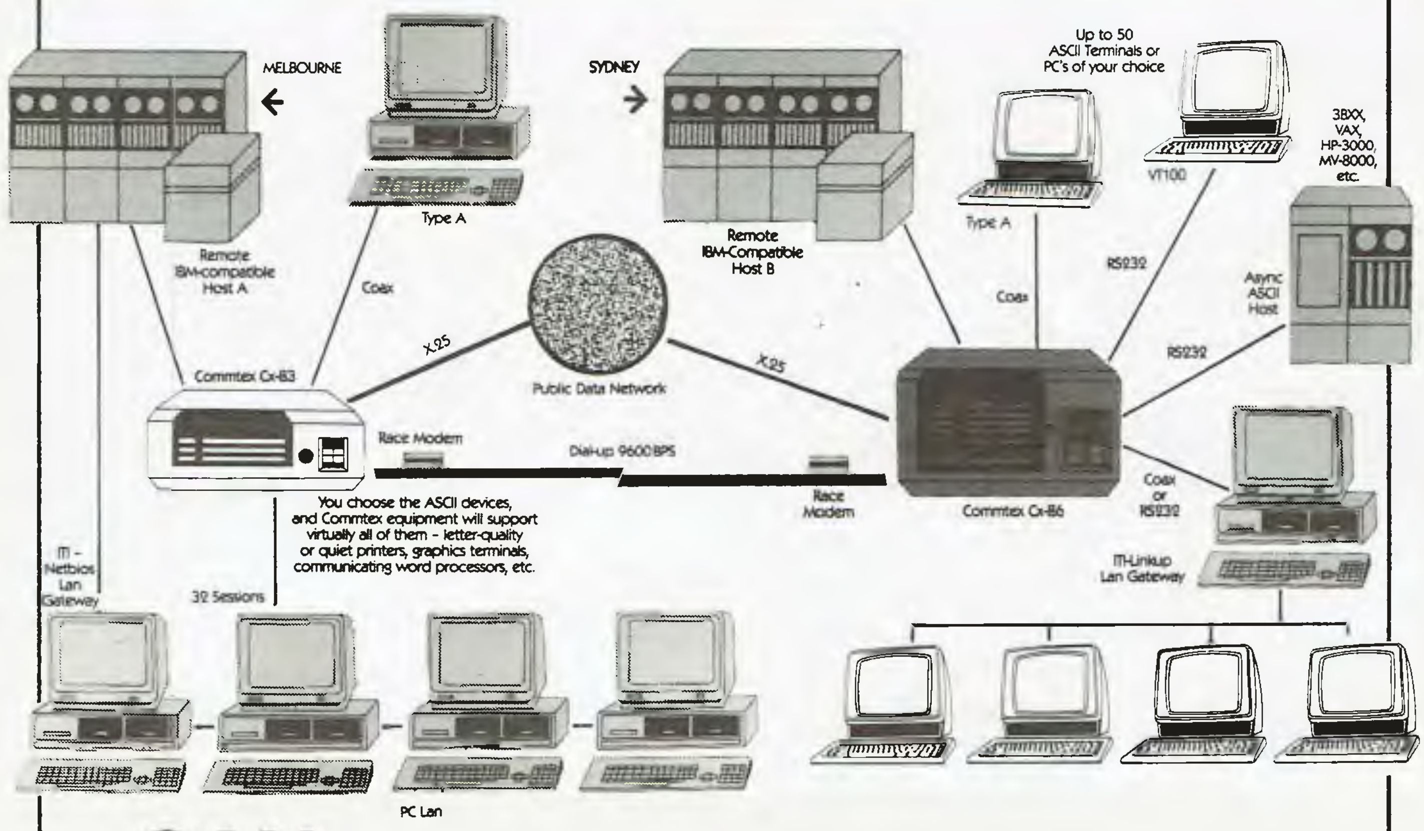
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connect user nodes which are connected via a local area network. They will both win. I think every medium or large corporation will make a strategic commitment to both LU 6.2 and OSI.

■ Will IBM support OSI?

You have to remember that SNA is a North American phenomenon. Europe cannot and does not support large leased-line networks, primarily for cost reasons. Consequently, IBM is up to its ears in supporting OSI in Europe. In fact, I have been told that when you order an MVS system from IBM in Europe you get your choice of SNA or OSI support. After pushing SNA for 13 years in North America, IBM has a somewhat difficult marketing problem if it runs out and embraces ISO. Therefore, the introduction of ISO in the States must be carefully choreographed by IBM — and they are great dancers.

■ You have not mentioned MMLs — is there a reason?

No. MMLs are the user's primary means of achieving connectivity. So they are not going away. If anything, the demand for MMLs will continue to grow. I am bullish on MML technology. I think it has come a long way in the last couple of years and the second generation of products is a major leap forward.

The problem with "micro/mainframe link", like "connectivity", is that the phrase covers a lot of territory. There are links that are freeware, like Kermit, and Links that cost $100,000 or more, like Infogate. And there are 600 products in between.

■ How do you tell them apart?

First you slay a goat.

By that I mean most people can't. The reason we have 600 products is because anybody can write a file transfer package — and "anybody" has. Most link vendors, in fact I'd say over 80 per cent, have no prior background in data communications. The result is that there are lots of products which can move Ascii characters around but the there are not many products that really understand the subtle problems of data communications in complex networks.

■ You said that you are bullish on MMLs. Does this mean that you see lots of growth here?

Not necessarily. We are going through a cycle that is not unlike that of other technologies. Many of the first link products were prematurely released. In addition, endusers found that there are significant performance problems in using a 9.6 leased line to move 20 megs of data during prime time — even with a fast link. I'm being funny when I say "20 megs" but I want to make the point that first time link users have expectations for file transfer performance which are completely out of line with reality.

And users did things with the first MML products that the average developer never thought they would. The result was that many users became very sceptical of the claims of vendors and rightfully so. Today a minor checkout is underway because we have more products than we have market — just as we once had 62 different 5¼inch disk manufacturers. At the same time, the "good" vendors have addressed the weaknesses of the early products and their "next release" is a substantial improvement. Of course, users are fed up with the promise of "the next release".

■ Where do you think all of this is going in, say, five years?

I think links are going to be a standard technology on every user's desk, but the link may be layered under some other "node management" software and the user does not concern himself with the location of the data or even its attributes. The user requests data from "the network" and "the network" locates and transforms the data as required.

I also think link products will support PC-mini, mini-mini, PC-host and mini-host file transfer. In the IBM world, they will evolve to independent Vtam subsystems largely for performance reasons.

Larry DeBoever is president of DeBoever and Associates, and is a leading authority on system integration and connectivity issues of Fortune 2000 companies. He has 20 years of industry experience. He has been a systems programmer (IBM), startup founder (Pansophic/Christensen Systems) director of strategic planning (Ungermann-Bass), and president of a data communications company (Linkware). He also serves as chairman of the National Connectivity Symposium. Deboever recently completed a new report (September, 1987) entitled Corporate Connectivity: Concept, Technologies & Trends. His report on DEC-IBM Integration: Technologies and Strategies is due in November.

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Company growth reliant on Lan systems

Networking can play a vital part in corporate direction writes Roy Pepper

COMPANIES today are installing Lans as either a pilot or departmental project. These Lans will grow! The users will want access to the host computers and to other databases within the organisation. The first system installed often decides the corporate direction and may be a very restrictive network for the future.

The process of evaluating networks is difficult. Most of the present discussion revolves around the various technologies. The most overlooked factor may be the functionality of the network management hardware and software.

General purpose networking involves a general-purpose solution to the problem of networking computer, terminal and other information processing equipment from different vendors. The interconnection of the equipment from manufacturers requires a well-managed network — the system must provide an easy-to-use editor — plus statistics, accounting and security options.

To better describe the importance of the network management function we should review the systems hardware used by three of the general purpose networkers: Ungermann-Bass, Sytek and TRW.

Ungermann-Bass uses either an IBM PC XT or AT or, in a larger system, a Sun workstation for network management.

Sytek uses a proprietary network server or, in larger networks, an NCR Tower for system management.

TRW uses a PDP 11/23 or a Vax 11/730 750 processor to control and monitor systems.

Using these sophisticated CPUs, these vendors provide true network management capabilities which include the tools to monitor availability, reliability and serviceability of their Lans.

The network management tools are often extended not only to monitor devices but to identify media problems on the networks. The Catv equipment used for a broadband coaxial cable system can provide trouble reports and statistical information back to the system headend which can be included as Lan diagnostic information a the management centre.

With a large network, up-time is critical and every minute saved in diagnostics is important. There is nothing worse than a technician trying to find the trouble-causing device or location and having irate users complaining about the problems. Diagnostic tools provide a fast means of trouble isolation and often problems are resolved from the central management location.

In addition to reporting trouble situations, the system management software provides administrative tools for the configuration, monitoring, accounting, security and broadcasting of general management messages. The software for these features is resident at the central management console or server.

Restoring connections

Network configuration or reconfiguration, with the larger network suppliers, is accomplished via a dynamic software download from the management centre. Any failures, due to equipment being turned off or catastrophic power failures, result in the system interface units requesting new software or configuration files. Using the high-speed CPUs, the Lan is often returned to service before the attached devices have come up. In this area, some of the Lan systems will even restore the original connections through the network intelligence.

The accounting software allows a manager to cost account using an event log which includes such elements as connection requests, disconnections, log-in, and where applicable, security breaches. Accounting can mean departmental budgeting or tracking and identification of heavy users for chargeback. These statistics will allow managers to recognise potential problems to take action before users complain about response times and throughput problems.

Security on a Lan can be provided by controlling who can connect to whom, and having password capabilities. Control of the user is often frowned upon and is referred to as "port management". But there are definite requirements in larger organisations for different levels of security.

A terminal may be in an area of easy accessibility or different departments may be configured for specific community of interest communications. The security and administration software provides the manager with information on breaches or attempted security breaches. Security can also mean protection of data files through features such as record and file locking or password access to both the network and the information.

As your network grows and more users request access, management capabilities will become more critical. Therefore, when evaluating your Lan vendors, take the time to reflect on your corporate management needs.

● *Roy Pepper is an independent consultant with more than 23 years experience in the communications field. He is a seminar leader at Connectivity Symposia.*

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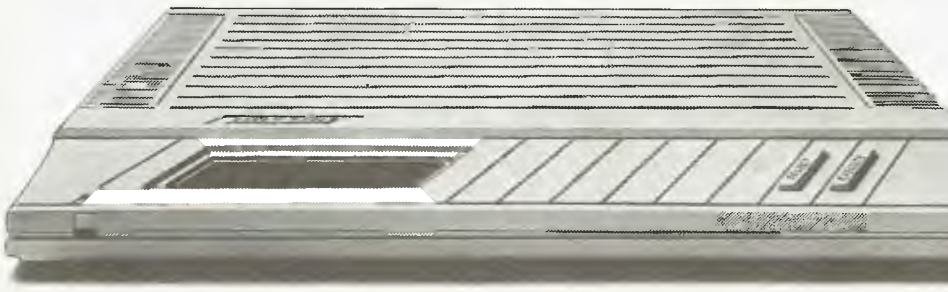

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Flexibility the key to freedom

Easy systems communication should govern the choice of Lans writes Richard Freemantle

Senior executives face what is arguably the most important data processing decision of the decade. Sooner or later, every company that aspires to have an efficient, responsive data processing centre, primed to profit from future technological change, must select local area networking (Lan).

Lans are a state-of-the-art approach to linking together computers, peripherals and associated office equipment to make possible extensive sharing of resources, information and computer power. High-speed, multiple-access Lans are available for offices, factories and other data processing environments.

A wise choice will put a company in a position to take full advantage of future developments in the computer field to integrate new technology with existing technology.

The need for a Lan in a company that has a large and growing number of computers and widely dispersed terminals would seem self-evident. But many companies, while recognising the need for a sharing of these resources, deal with the problem in a makeshift manner, using telephone wire and point-to-point cable.

Cable congestion

As personnel in a company acquire a taste for data, the company faces an information explosion. As more people are assigned terminals, more want them. Mainframes, microprocessors and minicomputers proliferate. A company relying on makeshift links soon finds itself tangled in wire with ceiling ducts choked and cables spreading everywhere from ugly, spaghetti junctions.

But cable congestion is not the only problem.

In meeting its data processing requirements, the company has probably purchased machines from different vendors. This limits the extent to which it can establish simple point-to-point linkages. Information Systems (IS) managers will need to be able to link together a variety of machines from different vendors distributed through one or more buildings to create a unified information base.

The situation has become more complicated by the merging of previously separate functions such as data, voice, video and building monitoring services. Developments in associated office services, such as digital PBXs, telex and facsimile systems, have made it possible for them to become part of the overall information system and include such functions as video conferencing.

Ideally then, IS management needs to be able to get all makes of terminals to talk to all makes of computers and all makes of micros to talk to all makes of mainframes; and all these machines should be connected to associated office services. At the same time, IS management must be able to keep up to date with technological developments.

All this can be achieved through careful selection of a Lan.

Some IS managers may find the task of assessing different Lan technologies and distinguishing among baseband or broadband or fibre optic cables too daunting. They may be tempted to turn to particular vendors and let them shoulder the agony of decision-making.

But vendor-dependent solutions tend to lock users increasingly into one supplier and close the door to products of other vendors that might be exactly suited to a certain requirement.

The aim should be to achieve a Lan that allows equipment built by different manufacturers and programs running under different operating systems to communicate freely — to be in a position to integrate all the organisation's resources and not just those from one supplier.

The company has made a sizable investment in existing equipment. The network selected must be compatible with all of it.

At the same time, an IS manager needs the freedom to expand and upgrade network servics as technology develops. The key to achieving the freedom to integrate and grow is flexibility, and flexibility is best achieved through vendor-independent suppliers — they are in the business to provide gateways to as many hardware vendors as possible.

The single vendor will always benefit from the "comfort factor" — the tendency to take the easy way out and let someone else assume the responsibility.

- *Richard Freemantle (right) is general manager for Network Solutions Australia Pty Ltd.*

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Mergers vital to Lan success

Suppliers are merging in attempts to meet the need for corporate-wide networks writes Clare Fleig

AS USERS move from stand-alone departmental local-area networks (Lans) to companywide communications systems, traditional Lan vendors are increasingly turning to mergers and strategic alliances as a way to meet their customers' complex needs.

Corporate networks often consist of multiple interconnected Lans that provide enterprisewide connectivity services, including access to telecommunications networks and corporate hosts. This requires integration of a wide variety of products, including IBM personal computer Lans, transmission control protocol/internet protocol networks that connect multiple hosts, micro-to-mainframe links and telecommunications gateways.

But until recently, vendors specialised in one or two of the above products. As a result, Lans that were generally billed as solving all of the corporation's ills more often than not contributed to MIS headaches.

So, with competition heating up in the corporate networking market and expertise at a premium in key areas like IBM's systems network architecture (SNA) and telecommunications, a growing number of network vendors are taking the merger or strategic alliance route as a way to acquire key networking products without having to develop them from scratch.

Partnerships have become crucial to success in the communications marketplace. To be competitive, users need, and vendors should supply, the following key connections:

■ **Lans:** This capability should range from small department-size Lans to utility Lans capable of linking departmental Lans into a large companywide backbone network.

■ **SNA:** With more than 25,000 SNA networks in Fortune 2000 corporations, the ability to supply an SNA gateway between disparate networks and processors is necessary.

■ **Major vendor compatibility:** At a minimum, communications vendors will be required to support products from IBM DEC, and Apple Computer.

■ **Telecommunications support:** Corporate short-term requirements call for supporting packet data switching and T1 connections. Long-term support will encompass support for Integrated Services Digital Network.

● *Clare Fleig is director of systems research specialising in local-area networking and IBM communications for International Technology Group.*

Cable TV spawns broadband

BROADBAND system networking technology is an evolutionary extension of US and European cable television distribution systems. With a broadband system it is possible to integrate all computer networks, television and video information systems, security systems, voice communications, energy management systems and building monitoring and control, all on the one cable system.

Additionally, any outlet on the broadband system may be used for any of these services because, unlike other proprietary networks, each service occupies a separate frequency channel and not a physical pair of copper conductors.

A broadband system can best be viewed as a two-way multi-lane highway upon which each service has a dedicated lane, with all bi-directional lanes having on/off ramps at each outlet.

It offers several advantages over other types of cable distribution methods. Multiple twisted pair cabling systems are very limited. Each pair is dedicated from point to point. This leads to constant re-arrangement of cabling to service the changing needs of a building, with many complex and untidy distribution allocation points (distribution frames). Further video signals cannot be transmitted on twisted pair cables.

Equal access

Baseband coaxial cable systems are "single user" networks for data communications only. All devices attached to the network have equal access to communicate over the network. Significantly, on large baseband networks, congestion is a real problem, where frequent data collisions cause rapid deterioration of performance. In addition, the mode of connection to the network can prove unreliable.

Optic fibre systems can be implemented as either baseband data networks or the fibre equivalent of twisted pair distribution systems discussed earlier, with their attendant distribution frames. Optic fibre networks remain very much point-to-point technology and complex distribution systems are still required. Network expansion is very cumbersome due to the need for light spectrum regeneration at every outlet.

If a single broadband cable system is installed throughout a site (building, factory, campus), all electronic services can be contained on this cable and are therefore available at every location. From then on, re-arrangements, changes and additions to services are as simple as unplugging out of one outlet and plugging into another.

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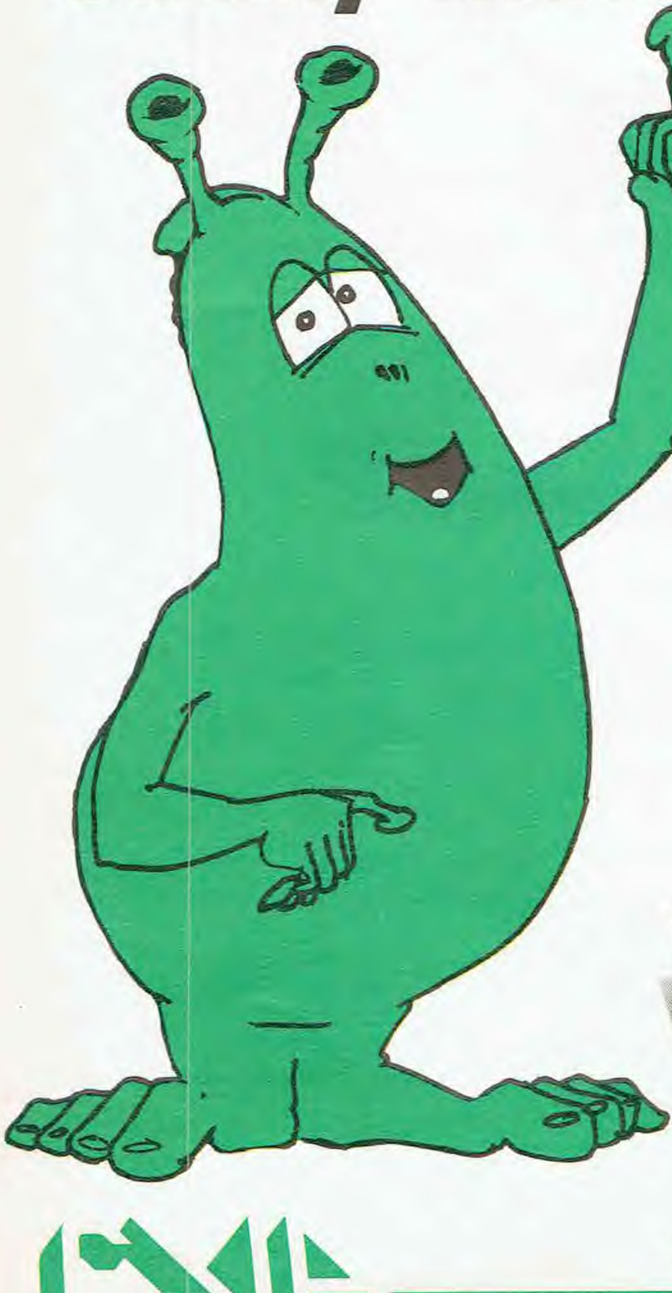

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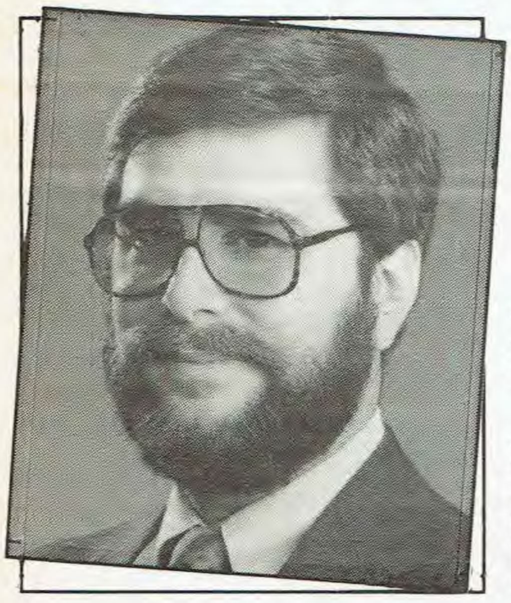


One-stop educational shopping

One of yesterday's problems for computer managers is still here today. Time, or the lack of it. With all of the technical journals, newspapers, mail, conferences and exhibitions, how can one ever get home, let alone lunch?

Digital Consulting Pacific believes it has a solution to the diminishing time available to evaluate an installation's strategic direction. It has been mounting symposia in North America for the past six years and has created an event that has now been transported to Australia and takes place at the Hyatt Kingsgate, Sydney, October 19-21.

Dr George Schussel, a leading figure behind the symposia said: "What we have tried to develop is a 'one-stop' educational environment where today's decision-makers have access to all the facts.

"Our research shows that DP professionals are too busy to search out a solution at an exhibition, too often get a lopsided picture at a seminar, and find that many conferences only give one half of the story," he said.

"Many professionals find it necessary to attend a number of conferences, exhibitions and seminars to get a full picture of the specific technology they are investigating.

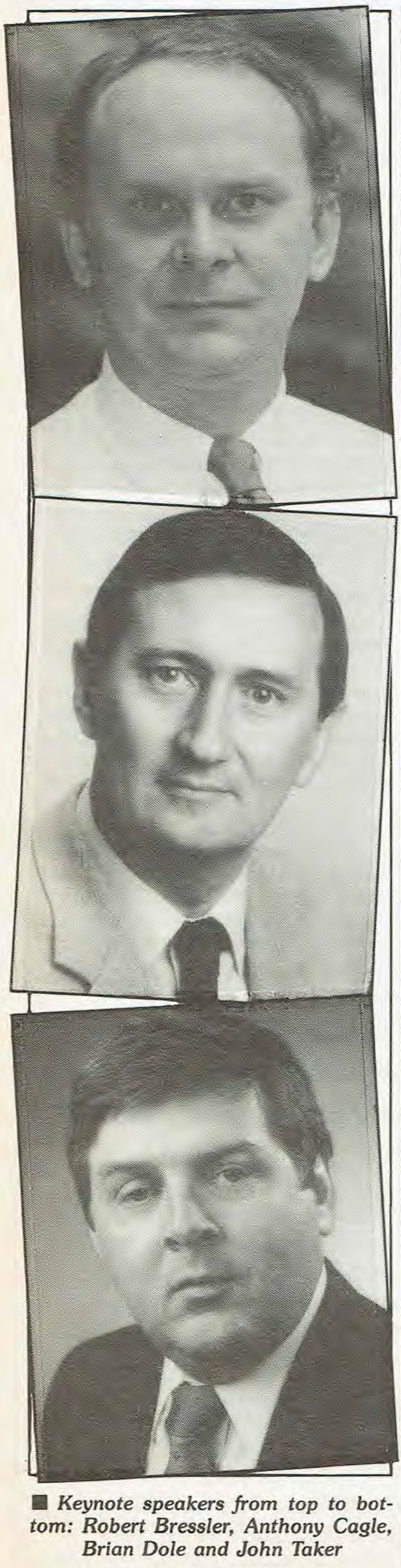
"This only compounds the 'lack of time' problem," Schussel added.

"Our symposia contain the elements of all of the traditional information gathering, skill-imparting, knowledge-building events."

The International Connectivity Symposium will have an intensive seminar on day one presented by a world authority on connectivity, Larry DeBoever. In fact it is a

(Continued page 12)

A two page review of the people and products at the International Connectivity Symposium



■ *Keynote speakers from top to bottom: Robert Bressler, Anthony Cagle, Brian Dole and John Taker*

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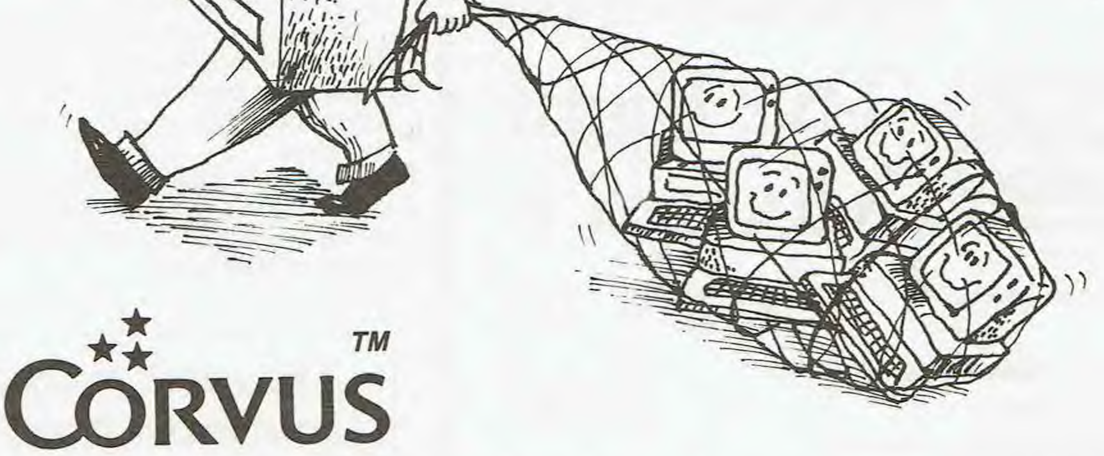

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(Continued from page 11)

two-day seminar crammed into one long, intensive day.

Days two and three will be made up of two streams of one-hour technical presentations on the leading connectivity products available in Australia. Many of the software and hardware vendors will run hospitality suites in the evenings, to give delegates the opportunity to discuss the products further and see demonstrations.

Over the three days guest speakers will present papers on various aspects of connectivity and how it affects today's professionals. Keynote speakers include:

ROBERT BRESSLER

Robert Bressler is vice president and general manager for 3Com Corporation's Software Products Division. He is responsible for managing the design, engineering, marketing and production of all of 3Com software products.

Before joining 3Com in 1986, Bressler spent more than 13 years at Bolt Beranek and Newman (BBN), Cambridge, Massachusetts, where he held a variety of senior management positions, including that of senior vice president of development and engineering for BBN Communications. At BBN, he managed such projects as Arpanet, the first major wide-area, packet-switched communications network; X.25 networking products, SNA gateways and database servers.

ANTHONY CAGLE

Anthony Cagle, manager of heterogeneous network Interconnects at Apple Computer, is responsible for defining architectures and managing the implementation of multivendor interconnects for the Apple II and Macintosh families.

Cagle has seven years' experience in data communications and networking areas including local-area and wide-area networks as well as small computer-to-host links. In the Lan area, he developed connections from the Datapoint networks. In wide-area networking, Cagle's experience includes developing connections between Wang systems and IBM systems, between Data General and IBM systems and between DEC and IBM systems. In addition, he has extensive development experience in IBM's APPC architecture.

Prior to Apple, Cagle spent years as a designer and planner for various network organisations that focused on developing document distribution architectures to facilitate communication among many multivendor environments.

BRIAN DOLE

Brian Dole is manager, Pacific Region, Meme International and has over 19 years' computer industry experience in the professional, consulting, education and training fields.

Dole studied VDU design at Bunker Ramo, Stamford, Connecticent for Honeywell; multiplexer design at Newton, Massachussetts, and modem theory operation and maintenance also at Newton. He developed an advanced frontend processor design for Honeywell, successfully managing its development in Hemel Hempstead, UK, and Boston, Massachusetts.

He lectures in OSI network design and mangement, protocols, Ethernet systems and installation, security and encryption techniques, and network planning.

JOHN TAKER

John Taker is the founder and president of Xicom Technologies of Ottawa, Canada.

Taker has 20 years' experience in a variety of technical management positions in communications networking and IBM systems programming environments. Before founding Xicom (a firm specialising in the development of software products for SNA connectivity), he was manager of advanced technology at Systemhouse Ltd, a large Canadian consulting organisation.

The title of his lecture is: "SNA-to-X.25: The value-added approach".

Products highlight

During the International Connectivity Symposium in Sydney on October 19-20 a number of Australian companies will make presentations of products and services.

Highlights of the presentations include:

ORACLE

Oracle Systems (Australia) Pty Ltd will present its SQL*Star distributed database technology. SQL*Star is said to allow users to access data in any database of a network without knowing its location. The facilities allow databases stored on different types of machines to be considered as one logical whole, regardless of the machines involved.

SOURCEWARE

PC communications distributor, Sourceware, will present the latest micro-to-mini-to-mainframe connectivity offerings from Digital Communications Associates.

Support manager George Westwood will present:

- Irma 2, an IBM 3278/79 mainframe connection.
- Smart Alec for turning IBM PS/2 Models 50, 60 and 80 into IBM 5250 mini connections.
- Irmalan family for bringing Irma terminal emulation functionality and mainframe APA graphics capabilities to PCs on a Token Ring or Netbios-based Lan.

TECHWAY

Techway Systems will present Ethernet products from Mitek Systems Corp, Flexlink International Corp, Network Research Corp and The Wollongong Group. The products are said to offer users the ability to select their hardware and software from any supplier that offers either an SNA or Ethernet environment.

The software products from Wollongong and Network Research are said to allow terminals and/or PCs to operate in an XNS, Decnet and TCP/IP Ethernet environment with any other device.

Mitek offers a gateway that marries the devices and the software to the network, a complete interchange between computers operating in an SNA/Ethernet environment.

Flexlink offers a direct channel attached to an IBM mainframe and comms port attached to a DEC Vax with transmission speeds to 24M-bytes.

NETWORK SOLUTIONS

Network Solutions Australia, an Australian networking consultancy, will discuss its products and expertise in networking and communications technologies. Broadband, IEEE 802.3, ISO, TCP/IP, XNS, SNA, X.25 and fibre-optics are a few of the features available.

AUSTRAL DATA NETWORKS

ADN Pty Ltd is the distributor for Australia and New Zealand of the BICC Data Networks product range. These include the solar range of copper-based and fibre optic products.

INTERLINK COMPUTER SCIENCES

Interlink Computer Sciences' Gateway product series integrates IBM and IBM plug compatible mainframes with a Decnet environment. Supporting IBM's VM and MVS operating environments, Interlink's gateways are said to provide bi-directional high speed data transfers, Interprogram communications, data translation and an RJE interface.

NOVELL

Novell offers a family of local-area network products for microcomputers that includes Advanced Netware. Novell's presentation will show how a network operating system's design can yield superior flexibility, functionality and performance.

XICOM TECHNOLOGIES

Xicom Technologies Corp specialises in the development of advanced computer communications software products. It will present the Micro Node product, a family of micro/mainframe links that provide IBM 3270 and 3770 emulation.

APPLE COMPUTER

"Apple Computer directions in micro to mainframe connectivity." The talk will focus on Apple's interpretation of IBM's recent announcement regarding SAA. An overview of Apple's recent announcements in the communication and networking arena will be followed by a discussion of Apple's future communication directions.

L M ERICSSON

L M Ericsson Pty Ltd will discuss its MD110 which uses twisted wire pair. It is said to permit data transmission on a network without compromising the integrity or operation of the voice network.

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SNA tools: a base for open network management

While the definition of open networks struggles to deal with issues of network management, IBM is positioning its own network management facilities to provide integrated management and control in a multi-vendor environment. IBM is proposing its well defined SNA network facilities form the basis for network management in open networks.

Feature	Net/Master characteristics	Netview characteristics
Extensibility	All extensions from creating command procedures to the implementation of new applications are done using the product's command interface Network Control Language (NCL). Only if new functions not originally included in the product.	Only operational enhancements can be accomplished within the Netview command language. Major enhancements such as the creation of management applications must be done by writing assembler code. The Netview command language is less sophisticated than NCL.

(Continued page 14)

THE Communications Network Management (CNM) facilities of SNA provide data structures and transport mechanism for the management of SNA components. The management and maintenance services of SNA define a set of network data elements for management, and a network management application to receive this data.

The data elements allow physical components in the network to:

- Collect and report usage and error statistics.
- Report errors requiring operational or engineering intervention.
- Test devices and logical structures in the network.

The CNM facilities were specifically aimed at operational and management support for network hardware.

Originally, each of the data elements defined performed a specific management function. A later more generalised data element is the network management vector table (NMVT) which allows network components to report information in a self-identifying manner. This allows a wide range of network components to report data to the network management application as long as that application is aware of the data formats to be used.

Data elements

The CNM data facility is specifically aimed at the physical components that make up the network. A later facility is to provide data relating to sessions established between network components. These data elements provide information about logical entities such as transmission paths and sessions.

CNM and session data do not provide adequate facilities for the monitoring of mainframe SNA applications. This must be done by processing the operator messages generated by those applications. This includes the mainframe implementation of SNA-Vtam. Early in the development of Vtam the programmable operator interface (POI) was defined, allowing a specialised Vtam application to receive messages and present commands in a formalised manner.

Other Vtam applications like IMS or CICS rely on the ability of the network management application to simulate operator control sessions and detect messages in the application data stream.

The original operations control application was motivated by the existence of the POI. It was built to allow control of the Vtam-based SNA network from Vtam terminals rather than the operating system console.

Gradually this was enhanced in two

(Continued page 14)

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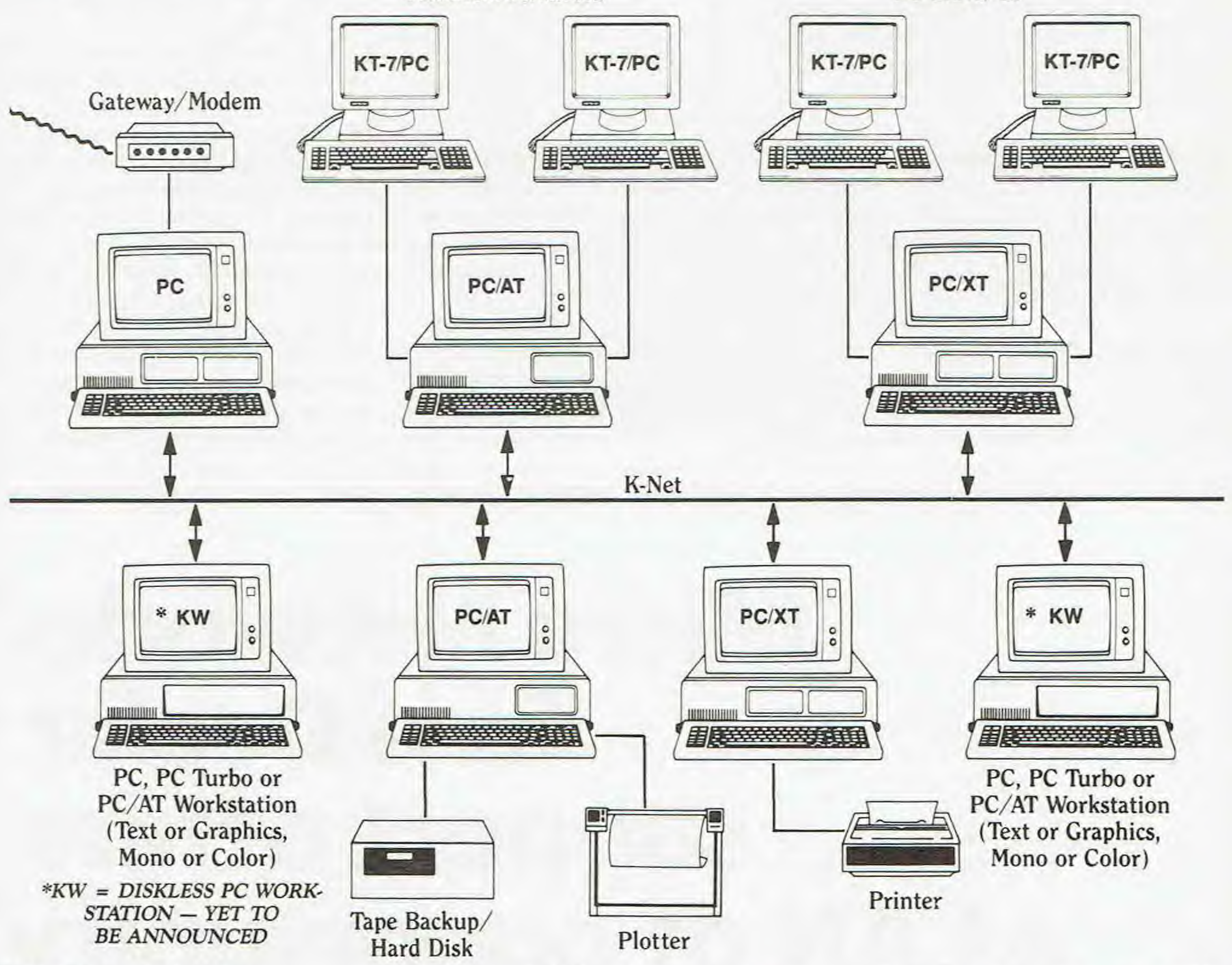
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Feature	Net/Master characteristics	Netview characteristics
Session data	Net/Master has included session data facilities in its Version 2.	Netview's session data application is NLDI. It gain displays session data collected in their network hierarchy.
Message processing	The structure of Net/Master is more suited to the message processing applications. It delivers and processes messages at a single point.	Netview contains a specific message processing application. However, because of its code structure, a message can be presented at more than one place. This leads to complexity in message processing techniques.
Operator displays	All operational modes have congruent interfaces and panel displays. Panel definitions allow full-screen full-color displays.	Operational modes in different applications do not use the same interfaces for the operator, although the different modes are being migrated and will eventually be congruent. Panel definitions are more complex but do allow a greater level of dynamic alteration.
CNM application	The CNM application of Net/Master is the Network Error Warning System (News). It displays data about network components alphabetically rather than in their network hierarchy. Like the rest of Net/Master, extensions to it are done using NCL. This makes it easier to add in different CNM data elements such as CNM data defined by non-IBM applications.	The CNM application of Netview is NPDA. It displays data about network components in their network hierarchy. Extensions to the NPDA facilities are much more difficult and must all be done in assembler language.
Database facilities	The NCL facilities of Net/Master include high-level command that give access to Vsam databases. Thus database type applications can be written using NCL and provide operator interfaces identical to other Net/Master applications	The macros provided with Netview include facilities to access Vsam data-structures. However, using these requires applications coded in S/370 assembler. These applications do not have easy access to the high-level panel definition facilities and operational interfaces may not be the same as other Netview applications.

(Continued from page 13)

ways. First was the development of more sophisticated operational facilities such as pre-defined sequences of commands to perform complex operational functions, or in response to detected messages. Most of this was evolved on an ad hoc basis by network users rather than within a formal development cycle. Second, the SNA defined network management application was implemented:

- The Network Problem Determination Aid (NPDA) was written to handle the CNM data elements.
- The Network Logical Data Manager (NLDM) was written to handle the session data.

All these facilities were packaged into the mainframe network management product NCCF.

Major problems with NCCF were caused because it represented a range of products such as NPDA and NLDM as well as a number of IBM provided examples and productivity aids. To present a single network management facility Netview was produced. This incorporated all the NCCF-related products into one facility.

While message processing remains important in the operation and management control of System/370 IBM SNA networks, the CNM application is more important in the multi-vendor networking environment. The CNM facilities are the defined mechanisms for management and maintenance services in an SNA network. They provide a regular deterministic mechanism for integrating data into the Netview management domain.

There are two multi-vendor situations. The first is vendor hardware obeying SNA protocols connecting into an SNA network. The vendors can use existing CNM data elements where appropriate or define vectors (NMVTs) specific to the needs of their products. The second situation occurs when a proprietary network has management data that would normally be handled by a separate network management facility.

NCR provides data definitions and an NCCF-based CNM application to provide management support for its SNA controllers such as the NCR Towers. Nixdorf has extended this to use the CNM interface to get data not only to its own NCCF application, but also data which is passed on to its proprietary management system running on its BNC controllers. This means all operational or management functions are consolidated under NCCF/Netview, and detailed performance capacity and configuration work is done using proprietary applications.

Unisys in its B25 product range has extended this concept by providing a command level interface to the CNM services. This allows users to access these services as a transport mechanism for user data. The data is now not restricted to the physical aspects of the network node, but can be accessed by programs acting on that network node.

IBM's solution to multi-vendor network management is Netview/PC. This is a CNM application program interface (API) on a personal computer, providing access to the SNA-defined CNM facilities. It creates a distributed control function called a focal point in the network. The focal point could be either a management interface for non-SNA network equipment, or a gateway for non-SNA network management data — a formal interface for any type of network function into the CNM services. It still requires the development of host processor software capable of understanding and manipulating the CNM data elements.

Net/Master is a software functionally equivalent to Netview. (For a comparison of Net/Master and Netview see the table comparing their features.) It has an important place in the development of multi-vendor networking because its coding and extensibility features are extremely good.

This should facilitate the development of product or vendor specific facilities on IBM mainframes. Further, the Net/Master coder, Software Developments, is in the unique position of being able to implement the SNA defined CNM application on non-IBM processors.

For complete management in the non-hierarchical, dynamic networks of either the ISO model or IBM's SNA peer model, a more diverse network management application must be defined.

● *Michael McKenzie is a consultant with Sydney-based DMR Consulting Group.*

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SPOTLIGHT ON
LAN SYSTEMS

compiled by
Gillian Sidebottom

AS MANY organisations have tended to build up systems comprising a hotch-potch of computers and peripheral devices from different manufacturers, multivendor connectivity and office systems integration have become important issues for many users.

According to International Data Corp (IDC) Australia, 25 per cent of a survey sample claimed to be using some form of local area network. A further 15 per cent expected to implement networking facilities over the next twelve months, and 16 per cent intended to introduce a Lan at some time in the future.

The realisation that, in present day business environments, full communications capabilities are required to share data and resources such as disks and printers has meant that networking, in principle at least, has become part and parcel of many companies' data processing needs.

The reality, however, has been somewhat different. Not too long ago, the Lan market was characterised by a great deal of confusion, intense vendor competition and conflicting technologies. The large number of vendor dependent data communications standards was largely responsible for this situation.

The picture in 1987 has now improved significantly due notably to the introduction of well-defined standards which should lay the foundations for future developments in networking.

				Access method				Transmission medium														
Lan	Number of networks installed in Australia	Baseband (Analogue/Digital)	Broadband	Dedicated/ Non-dedicated	Token Ring	Slotted Ring	CSMA/CD	Twisted pair	Coaxial	Optical	Other	Terminals and protocols interfaced	Protocol conversion	'Gateway' interfaces	Transmission speeds (bits/sec)	Max. No. terminals per Lan	Max. No. servers per Lan	Max. Lan range (m,km)	Standard software	Cost per connection	Installation cost	Specific environments addressed
JN Almgren Pty Ltd — 16 Smith St, Chatswood, NSW 2067.																						**Tel: (02) 406 6177**
AS1050	4	✓ D		✓							RS232C	Async	—	—	19.2K	100 async devices		No limit	✓	$300	$175 per unit	Local & distributed async devices
Apple Computer Australia Pty Ltd — 37 Waterloo Rd, North Ryde, NSW 2113.																						**Tel: (02) 888 5888**
Appletalk Communications Architecture	c.1300	✓		CSMA/ CA	✓	☐		✓ ★	✓	✓	PABX, CATV	Apple Macintosh, Laserwriter, etc, IBM PC & comp, DEC Vax, TCP/IP Decnet	Async. serial 3270 MS-Dos, IBM DCA Wang NBI	BSC/SNA 3270/ Ethernet servers	10M (Ethertalk)	31/zone	—	300m + (dep on space)	Network/ server	$90-1799 +	Var	Most
Case Communication Systems Ltd — 10-12 Rodborough Rd, Frenchs Forest, NSW 2086.																						**Tel: (02) 451 6655**
Equinox Data PBX	30	✓ A		DATA PBX				✓ ☆		✓ ☆	RS232, Fibre-optic, RS422 current loop	Any async.	—	T1-G703-Vax	19.2K	1920	120	5km	Onboard Rom	+$180	+$200	Campus, large factory etc
Computer Protocol — 33 Ryde Rd, Pymble, NSW 2073.																						**Tel: (02) 498 8588**
CP Lan	3	✓	✓		✓		✓		✓	✓		Async, VT100/200/ 240 and others	Uniscope, VIP7750 CO3 poll/select mode 4C Bisync	SNA 3270 X.25 TSO Class 4	10M	—	—	50km	—	Var	Var	—
Data Bridge Electronic Communications Pty Ltd — Suite 408, Henry Lawson Business Centre, Cary St, Drummoyne, NSW 2047.																						**Tel: (02) 819 6474**
Ungermann-Bass	—	✓	✓		✓	TB 802.4	✓	✓	✓	✓		Async, Sync. comp. PCs, most hosts	Various	SNA X.25	10M (CSMA/CD) 4M (TR)	No limit	—	No limit with bridge	Netbios TCP/IP XNS OSI	Fr $750	Var	Campus, factory etc
Data General Australia Pty Ltd — 100 Dorcas St, South Melbourne, Vic 3205.																						**Tel: (03) 698 6988**
DG/Starlan	—	✓					✓	✓				ISO TP/IP, XODIAC/ X.25 Netbios	—	SNA, X.25, TCP/IP XNS	1M	500	—	2500m	WTS XTS MS Net	PoA	PoA	PC Integration
Thin Ethernet	—	✓					✓		✓			ISO TP/IP, XODIAC/ X.25 Netbios	—	SNA, X.25, TCP/IP XNS	10M	150	—	1000m	WTS XTS MS Net	PoA	PoA	PC Integration Multi-vendor environment
Ethernet	—	✓					✓		✓			ISO TP/IP, XODIAC/ X.25 Netbios	—	SNA, X.25, TCP/IP XNS	10M	500	—	2500m	WTS XTS MS Net	PoA	PoA	

Key: ✓ = *column heading applies; — = column heading does not apply/information not supplied; Var = price dependent on configuration; A = Analogue; D = Digital; CSMA/CD-CA = Carrier Sense, Multiple Access with Collision Detection - Collision Avoidance; ★ = shielded/unshielded; ☆ = Dist server; ■ = mid/high split; ☐ = Ethernet 802.3; * = Token Bus 802.4; † = Daisy chain & star; ‡ = ex tax; § = Arcnet; # = custom installation; bsb = baseband; brb = broadband; TR = token ring; TB = token bus; TR = token passing; Adv = Advanced; N = Netware; LT = Linear topology; NR = New release; Et = Ethernet.*

The Product Spotlight on Local Area Networks is based on information obtained from a survey of Lan vendors conducted between August 20 and September 22, 1987. All details should be checked with the respective companies as listed.

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Lan	Number of networks installed in Australia	Baseband (Analogue/Digital)	Broadband	Access method: Dedicated/ Non-dedicated	Access method: Token Ring	Access method: Slotted Ring	Access method: CSMA/CD	Transmission medium: Twisted pair	Transmission medium: Coaxial	Transmission medium: Optical	Transmission medium: Other	Terminals and protocols interfaced	Protocol conversion	'Gateway' interfaces	Transmission speeds (bits/sec)	Max. No. terminals per Lan	Max. No. servers per Lan	Max. Lan range (m,km)	Standard software	Cost per connection	Installation cost	Specific environments addressed
Data Peripherals Pty Ltd — 1 Lyon Park Rd, North Ryde, NSW 2113.																						**Tel: (02) 887 2906**
Proteon Pronet-80	—	✓			✓					✓	IBM Type 1	IBM AT Multibus, Unibus, Qbus. VME bus	—	—	80M	100	64	2km	Adv N	$9093	—	Large corporations — mainframe host connection
Proteon Pronet-10	—	✓			✓					✓	IBM cabling microwave infrared	IBM AT Multibus, Unibus, Qbus, VME bus	—	—	10M	100	64	2km	Adv N	$1030	—	Fast mainframe connection
Proteon Pronet-4	—	✓			✓					✓	IBM cabling microwave infrared	IBM AT Multibus, Unibus, Qbus, VME bus	—	—	4M	100	64	2km	Adv N	$1310	—	—
Novell 68B S-Net	—	✓		✓				✓				Int/Ext bridging	—	SNA	12M	24	64	670m	Adv N 68	$470	—	Lan-Lan, -host, -PC
Novell Advanced Netware 86 & 286/E	—	✓					✓		✓			Int/Ext bridging	—	SNA	10M	100	64	185m	Adv N 86/ 286	$735	—	
Novell Advanced Netware 86 & 286/RX	—	✓		✓	✓ TP				✓			Int/Ext bridging	—	SNA	2.5M	128	64	6100m	Adv N 86/ 286	$655	—	
AST Starlan	—	✓				†		✓				Int/Ext bridging	—	—	1M	64	64	2600m	AST Adv N	$585	—	Entry level Lan
Data Point Corporation Pty Ltd — 157 Walker St, North Sydney, NSW 2060.																						**Tel: (02) 922 3100**
ARC and ARCNET	120	✓			✓			✓	✓	✓	IBM Type 1 3/6 shielded pair	IBM PC/XT/AT & comp, Datapoint terminal	Wang, Tandem, TTY, MS-Dos, Telex, Unisys, Honeywell, DEC	SNA/BSC X.25	2.5M	255	—	610m	Datapoint RMS	$1355 (PC)	Var	Office automation, PC Lans, Commercial data processing
Digital Equipment Corporation (Australia) Pty Ltd — Chatswood Plaza, Railway St, Chatswood, NSW 2067.																						**Tel: (02) 412 5252**
Ethernet	1000+	✓ D					✓	✓	✓	✓	Microwave	IEEE 802.3	—	SNA X.25	10M	No limit	No limit	8km	—	—	—	—
Hewlett-Packard Australia Ltd — 31 Joseph St, Blackburn, Vic 3130.																						**Tel: (03) 895 2895**
HP Thinlan	—	✓ D					✓		✓			IEEE 802.3	—	HP AdvanceNet	10M	30 nodes/ segment	—	185m/ segment	MS-Net	$1816/user $3288/server‡	#	Lan-host, PC-PC
HP Starlan	—	✓ D					✓	✓				IEEE 802.3	—	HP AdvanceNet	1M	500	—	250m between nodes	MS-Net	$1170/user $2723/server‡	#	Lan-host, PC-PC
Imagineering — 77 Dunning Ave, Rosebery, NSW 2018.																						**Tel: (02) 697 8666**
3 Com	1300+	✓			✓		✓	✓	✓	✓	Broadband		Via bridge	SNA 3270 X.25 XNS	10M	100/segment 1024/network	—	2.8km (coax)	3 Plus	$1000	—	—

*Key: ✓ = column heading applies; — = column heading does not apply/information not supplied; Var = price dependent on configuration; A = Analogue; D = Digital; CSMA/CD-CA = Carrier Sense, Multiple Access with Collision Detection - Collision Avoidance; ★ = shielded/unshielded; ☆ = Dist server; ■ = mid/high split; ☐ = Ethernet 802.3; * = Token Bus 802.4; † = Daisy chain & star; ‡ = ex tax; § = Arcnet; # = custom installation; bsb = baseband; brb = broadband; TR = token ring; TB = token bus; TR = token passing; Adv = Advanced; N = Netware; LT = Linear topology; NR = New release; Et = Ethernet.*

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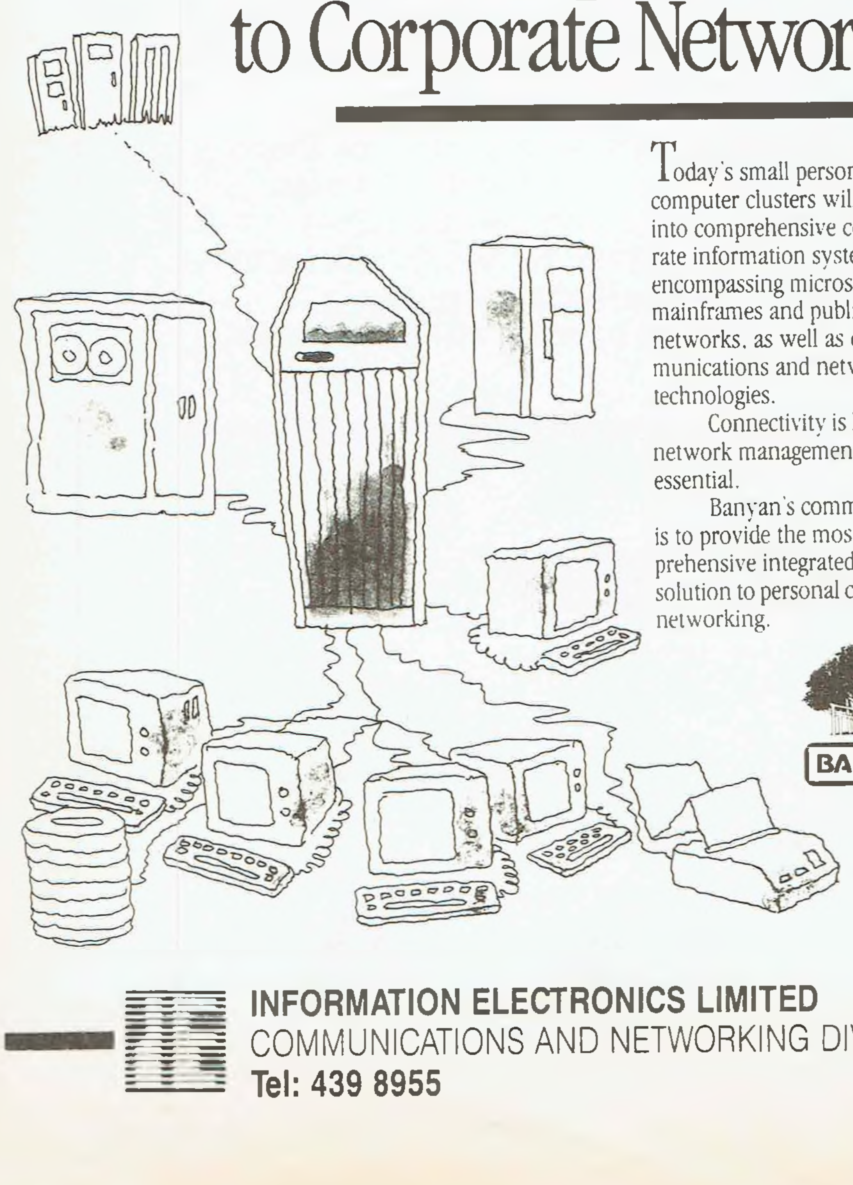

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Lan	Number of networks installed in Australia	Baseband (Analogue/Digital)	Broadband	Access method				Transmission medium				Terminals and protocols interfaced	Protocol conversion	'Gateway' interfaces	Transmission speeds (bits/sec)	Max. No. terminals per Lan	Max. No. servers per Lan	Max. Lan range (m,km)	Standard software	Cost per connection	Installation cost	Specific environments addressed
				Dedicated/ Non-dedicated	Token Ring	Slotted Ring	CSMA/CD	Twisted pair	Coaxial	Optical	Other											
Micro Networks Pty Ltd — Level 1, 1 Gurrigal St, Mosman, NSW 2088.																						**Tel: (02) 969 6922**
Univation Ethernet	—	✓		✓			✓ TCP/IP	✓	✓			IBM & compatibles	SMTP FTP	TCP/IP	10M	255	64	1km	Novell N & Lifenet	$875	—	Lan connection to DEC Vax
G/Token Ring	—	✓ D		✓	✓		✓ TP	✓	✓			IBM & compatibles	—	Async. X.25 SNA 5251	4M	255	64	100m	N V.2.0a Netbios	$1096	—	IBM houses
G/Net	1000	✓ D		✓	LT		✓ CSMA/CD/ CA, PA EDC		✓			IBM PC/XT/AT, PS/2 (30) & compatibles	—	Async X.25, SNA 5251 Fax TCP/IP	1.43M	255	64	6km	Novell Netware	$833	—	Lan/Wan requiring guaranteed data delivery
NCR Australia Pty Ltd — 8/20 Napier St, North Sydney, NSW 2060.																						**Tel: (02) 964 8111**
Towernet	—	✓					✓		✓	Opt		XNS Tower	—	SNA X.25	10M	100	—	500m	Towernet PC Connect PC Server	PoA	PoA	
Network Solutions Australia Pty Ltd — PO Box 1173, 77 Pacific Hwy, North Sydney, NSW 2060.																						**Tel: (02) 957 2733**
Sytek-LocalNet	—	✓	✓ A				✓		✓			Async, LocalNet	Ascii IBM 3270	—	19.2K (pcu) 38.4K (ptu)	32/server	32,768	30km radius	LocalNet	PoA	PoA	Spasmodic terminal traffic
Sytek-PC Network	—	✓	✓ A				✓		✓			Sytek LocalNet	—	Sytek 2000 SNA	2M	1000	—	5km radius	Netbios	PoA	PoA	
3 Com PC Network	500+	✓					✓		✓			IBM PC XT AT, PS/2 (30) Apple Mac	—	3270 Async. TR	10M	—	—	1000m/ segment	Ether Series 3+	PoA	PoA	
Bridge ESPL Products	50+	✓	✓		✓		✓		✓	✓		XNS TCP/IP OSI	SNA X.25	X.25, TR, bb, Multiple Ethernets	10M (bsb) 5M (brb) 4M (TR)	64/server	1024	2.5km (bsb) 15km radius (brb)	XNS TCP/IP Network Mgt	PoA	PoA	
Nixdorf Computer Pty Ltd — 655 Pacific Hwy, St Leonards, NSW 2065.																						**Tel: (02) 439 5477**
Nixdorf Ethernet	—	✓ D					✓		✓			Nixdorf, IBM, DEC, Unix	3270 Ascii	TCP/IP IEEE 802.3	10M	Host dependent	—	2.5km	KNET (VM/ 370 req)	$8000/host	Var	Multi-host environments
Nixdorf Broadband Network (NBN)	—		✓ ■	✓			✓		✓			SDLC, HDLC, Bi-sync, Async, IHSS	All standard	IEEE 802.X	1.2K-2M	Dependant on protocol req		2.5km	—	$1000-3000	Var	Multi-host/terminal environments
Porchester Computers Pty Ltd — 177 Barkly St, St Kilda, Vic 3122.																						**Tel: (03) 537 2722**
Orchid Technology PC Net + Advanced Netware (Novell)	4000+	✓					✓		✓			IBM PC XT AT & compatibles	—	Netware gateway compatible	1M	50	—	7000m	Adv N 86/286	$950	Var	All Lan environments
Prima International — Unit 6, 49-51 Salisbury Rd, Asquith, NSW 2078.																						**Tel: (02) 476 5944**
Tigan	New prod.	✓ D					✓	Opt	Opt	Opt				SNA 3270 X.25 XNS	10M	No limit	No limit	5000m	Tigannet Novell	$900 av.	PoA	
Prime Computer of Australia Ltd — Philips Bldg, 1st Floor, 15 Blue St, North Sydney, NSW 2060.																						**Tel: (02) 929 0044**
Ringnet	150	✓ D			✓				✓	✓		X.25	—	SNA TCP/IP	10MHz	255 nodes		510km	PrimeNet	PoA	PoA	Prime host environments
Lan 300	New release	✓					✓		✓	✓		Async. X.25 TCP/IP	IEEE 802.2	SNA	10MHz	1024 terminals/servers		2.5km/node	PrimeNet NTS WS1300	$400/ terminal	—	Terminal/host PC based networks
Shuttle Datacomm Pty Ltd — 456 St Kilda Rd, Melbourne, Vic 3004.																						**Tel: (03) 267 1011**
Vianet	50	✓					✓	✓	✓			IBM PC/XT/AT	—	Async	1-10M	255 nodes		300m+	Vianet any PC package	$1000	Var	Peer to peer network
SPS Software Product Support Pty Pty Ltd — Suite 21, Chatswood Village, 47 Neridah St, Chatswood, NSW 2067.																						**Tel: (02) 419 5366**
PC Mos/386	5000	✓ D			✓			✓				XPC XON/XOFF	—	—	115K	16	16	50m	—	$295	$1100	—
Supernet Systems — 7-9 Merriwa St, Gordon, NSW 2072.																						**Tel: (02) 498 6611**
Corvus Omninet	250+	✓ D			LT		CSMA/CA	✓				IBM & compatibles, Apple Mac, Rainbow, Corvus Concepts	MS/PC-Dos, 2 upwards Pascal, Pro Dos, Apple Dos, CP/M	Async, X.25, SNA, etc.	1M	64	8	1200m	Novell Adv N Constellation PC Nos	$575	Var	
Techway Systems Pty Ltd — 61 Lavender St, Milsons Point, NSW 2061.																						**Tel: (02) 929 4988**
Flexlink	—	—	—	—	—	—	—	—	—	—	Channel attached to IBM Bus to DEC	IBM Channel 3270 TE File	Transfer plus Application Interface	—	24M	128 virtual circuits	—	2km	—	$1000	$2600	IBM-DEC connection
Hyper channel	11	✓ D					✓ CSMA/CA				Microwave Satellite	High speed computer channels	40+ operating systems	TCP/IP	200M (4 x 50)	256 adapters	—	4000km	Netex RDS	$275/ terminal	—	Disaster recovery links in IBM environment. High speed file transfer in multivendor mainframe sites
Unisys Australia Ltd Ltd — 30 Alfred St, Milsons Point, NSW 2061.																						**Tel: (02) 963 6000**
Blan (EN3) (Ethernet)	—	✓ D					✓		✓			IEEE 802.3	B-net	✓	10M	99 nodes	—	500m+	Blan & Bnet	PoA	PoA	Inter-cluster networking
Blan (LN3)	2	✓ D					✓				Tri-axial	IEEE 802.3	B-net	✓	10M	99 nodes	—	185m+	Blan & Bnet	PoA	PoA	Inter-cluster networking
Unisys Usernet 2	—	✓ D			✓			✓				IEEE 802.5, ISO OSI	—	✓	4M	240	8	2-16km	Usernet 86 & Novell N 286	PoA	PoA	
XE5XX/B2X/B3X Cluster	9000+	✓ D		✓				✓		✓		RS422-HDLC polling protocol	—	—	1.8M	Up to 64	—	400m	Btos	PoA	PoA	Inter-workstation networking
Unisys PC-Usernet	70	✓ D					✓	✓				RS422/HDLC	—	✓	1M	100	8	1000m	Usernet 86 & Novell N 286	PoA	PoA	

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Lan	Number of networks installed in Australia	Baseband (Analogue/Digital)	Broadband	Access method				Transmission medium				Terminals and protocols interfaced	Protocol conversion	'Gateway' interfaces	Transmission speeds (bits/sec)	Max. No. terminals per Lan	Max. No. servers per Lan	Max. Lan range (m,km)	Standard software	Cost per connection	Installation cost	Specific environments addressed
				Dedicated/ Non-dedicated	Token Ring	Slotted Ring	CSMA/CD	Twisted pair	Coaxial	Optical	Other											
Unisys Australia Ltd Ltd — 30 Alfred St, Milsons Point, NSW 2061.																						**Tel: (02) 963 6000**
Net 5000-7000 (Ethernet)	1	✓ D					✓		✓			IEEE 802.3	UUCP	✓	10M	64 x 240	64	—	Unix TM A&T	PoA	PoA	Networking Unix processor
TDI	6500 +	✓ D		✓				✓				Unisys poll select	—	Async.	To 38.4K	9	—	300m +	Unisys	PoA	PoA	Local terminal network
CPlan (Ethernet)	6	✓ D					✓		✓			IEEE 802.3	—	—	10M	—	100	500m ≠	Unisys BNA	PoA	PoA	Host-host, -workstation, workstation-workstation
Wang Computer Pty Ltd — 168 Walker St, North Sydney, NSW 2060.																						**Tel: (02) 925 5678**
Wangnet/Fastlan comprising:	52/125																			PoA	PoA	
Wang Systems Service			✓				✓		✓			Wang VS, OIS, Alliance	—	—	10M	24/63/host	—	6.5km	Netcore VSTE	—	—	Wang VS and OIS inter-system communications
Peripheral service (Wang and IBM)			✓						✓			Wang VS, IBM 3270/3274	—	—	4.27M	32 devices/channel (19 channels)		13km max.		—	—	Peripheral/terminal-host
Wang Professional Network Service (Wang PC Band)			✓		TP				✓			Wang PCs	—	—	2.5M	225/channel (4 channel)	—	13km max.	PC-PM075 inc.	—	—	Messaging, document & file transfer and resource sharing
Multi-vendor service			✓						✓			Async. IBM PC & compatibles, 3270, 802.3, networks	—	—	To 10M	Dependent on configuration			—	—	—	
Utility services	provides standard closed circuit video for user defined applications 12.7MHz video channels																	4 miles				
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The Product Spotlight on Local Area Networks is based on information obtained from a survey of Lan vendors conducted between August 20 and September 22, 1987. All details should be checked with the respective companies as listed.

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CW #13 October 2, 1987

Solutions for the Unisys user

Simon Maxwell and Lawrence Duckworth suggest some precautions.

UNISYS PCs running industry standard MS-Dos, and Unisys B20-Series (Convergent Technology lookalike) micros with Btos are used extensively within most Australian and New Zealand companies using Unisys mainframes.

By mating these microcomputers (and their micro programs such as Lotus 1-2-3, Wordstar, Multiplan, dBase III and so on) with mainframe data, powerful, synergetic results can occur. Used effectively, a 1+1=3 result can occur. The benefits for enduser departments are briefly summarised in Fig 1.

The importance of better information through computer linking in order to "work smarter . . . not harder" can be understood, as is reflected in Fig 2.

For the typical enduser, mainframes are: unavailable spontaneously, comparatively costly to use, relatively inflexible for sporadic needs, and require considerable upkeep and expertise. But micros are low cost, compact, durable, somewhat portable, have simplified software, can be personally controlled, are immediately usable when needed, and are easy to use. By linking micros to corporate mainframes many opportunities become available:

Within the realm of linking micros to mainframes, several usually progressive levels are possible. An overview of them is contained in Fig 3.

Terminal emulation and advanced file transfers are the main methods in vogue at present, and almost every Unisys mainframe user in Australia and New Zealand has a micro with a terminal emulation package.

Terminal emulation is the ability for the micro to provide the same capability as a Unisys terminal provides. There are two different streams of terminals available from Unisys: UTS20/40 type terminals for Unisys 1100 mainframes, and ET1100/T27 type terminals for Unisys A-Series and the older B-Series mainframes.

These two terminal types are quite different and are not compatible. Interestingly, the protocol level for UTS terminals is complex in comparison to the simple poll/select protocol for ET/T27 terminals, yet the screen formatting for UTS terminals is simple in comparison to ET/T27 terminals.

Terminal emulation programs need to cater for the appropriate protocol, and the efficiency of the micro in handling this protocol at various line speeds, and simultaneously with other micro programs, requires sophisticated implementation techniques.

File transfer is the ability to download or upload files to/from the mainframe and the micro. The formats of the files on the micro and the mainframe are different and this generally needs to be taken into account.

Typically most files transferred are data files, but some advanced uses include transmission of binary or code files, and special file types such as SDF files on 1100 systems.

Different modes of operation are often required: unattended file transfers, host-initiated file transfer, and background file transfers (while the micro is performing other functions) are common, as well as a variety of operating environments such as under TIP or Demand mode on 1100 systems or under all of the various types of MCS's on A-Series.

Data extraction

Database extraction programs allow relatively non-technical endusers to extract mainframe data easily and quickly, automatically reformat it for Lotus, Multiplan, Wordstar, dBase and so on, and use it in these popular programs at will.

Virtual disk programs enable the mainframe to become a file server for many micros. The micros could be individual micros or Lans, and the virtual disk programs in essence provide a wide-area network and gateway between the customers' micros. The use of such an approach provides many of the benefits of conventional Lans and wide-area networks.

Lan Gateway programs enable a Lan to be connected to the mainframe via one physical connection from the server or master workstation. All micros on the Lan may use all of the different levels of micro/mainframe mating, as described above, without any additional cabling or connection to the mainframe.

In summary, a wide range of features and capabilities exists for Unisys users to link micros effectively to mainframes.

A proper onsite evaluation of the required micro/mainframe product, including checking the full compatibility with existing terminals, performance tests, and testing of supplied features, is essential.

• *Simon Maxwell is director of Information Gateways Pty Ltd, and Lawrence Duckworth is president of Intercomputer Communications Corp.*

BENEFITS OF MICRO-TO-MAINFRAME MATING

DEPARTMENTS	BENEFITS/USES		
DATA PROCESSING System control	Can integrate micros into the "system," reduce departments' demands on DP, control data security and quality and much more!		
SALES & MARKETING Micro-to-mainframe data analysis	Customer buying analysis Salesperson productivity Geographic penetration Sales forecasting Strategic planning	Products performance Margin Analysis New product planning Market research Ad planning	Competition analysis Share analysis Prospect management PR management and much more!
FINANCE Micro-to-mainframe data analysis	Budgeting P&L planning Cash flow management Budget variance analysis General accounting	Receivables management Payroll analysis Capital budgeting Investments management and planning	and much more!
OPERATIONS Micro-to-mainframe data analysis	Work scheduling Manpower planning and control Cost analysis Personnel and benefits management	Inventory control Quality control Budgeting Maintenance management and much more!	
BANKING Micro-to-mainframe data analysis	Account analysis Prospect planning Loan tracking Credit analysis Trust management	Cash management modeling Branch performance Asset/liability management and much more!	
GOVERNMENT Agencies, departments, bureaus, etc. (Local, State, Federal) Micro-to-mainframe data analysis	Budgeting Operations planning Personnel administration Financial management Strategic planning	Maintenance management Citizen relations Benefits administration Operations control and many more!	

Fig 1

How to achieve better management

The steps	Needed
Better planning	Information
Better implementation	Information
Better control	Information

Fig 2

- ■ Regains DP control of the "information system"
- ■ Provides better data security and data integrity
- ■ Provides endusers with increased productivity and timeliness if they can combine file transfers to/from mainframe data and popular micro application programs
- ■ Saves hardware costs on terminals, printers, plotters, and so on
- ■ Reduces the DP backlog
- ■ Makes companies more able to respond and compete
- ■ Provides for more data sharing and less duplication of efforts
- ■ Improves overall organisational productivity and reduces general operating costs
- ■ Micros become a managed resource

Fig 3

Basic levels of micro/mainframe linking today

Terminal emulation: Switch back and forth between emulation and micro application program use

File transfers: Transfer data in and out of mainframe, for reformatting on micro

Multi-user secured file transfers: Multiple security levels, audit reporting, and resource controls

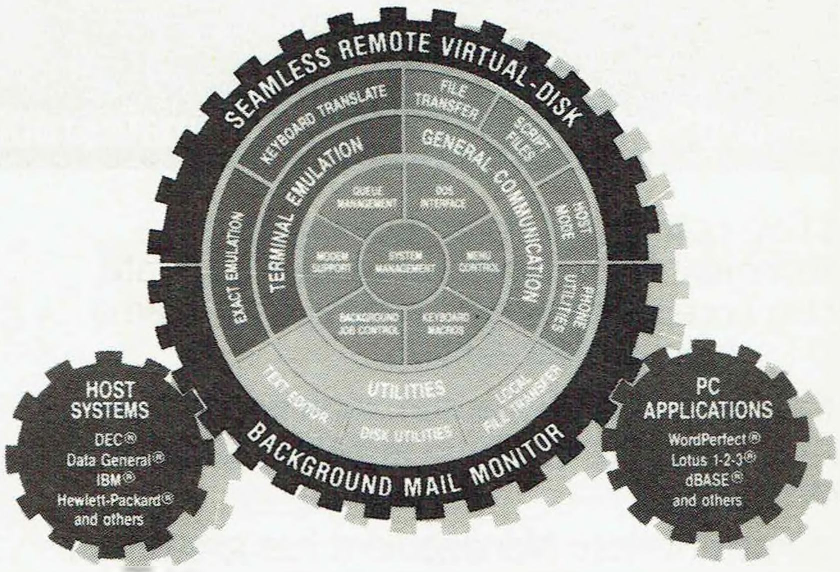
Database extraction: Selectively extract and reformat data at mainframe level

Virtual disk storage on mainframe: Make the mainframe look like a micro hard disk, and share files with multiple users

Lan Gateway: Connect Lans to mainframes

Fig 4

SOFTERM® PC



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ADDS Viewpoint ,78
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Datapoint 3601,8220
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Hazeltine 1400,1410,1500,1520
Hewlett Packard 2622A,2392A
Honeywell VIP7205,7801,7803,7813
IBM 3101-10,3101-20,3162
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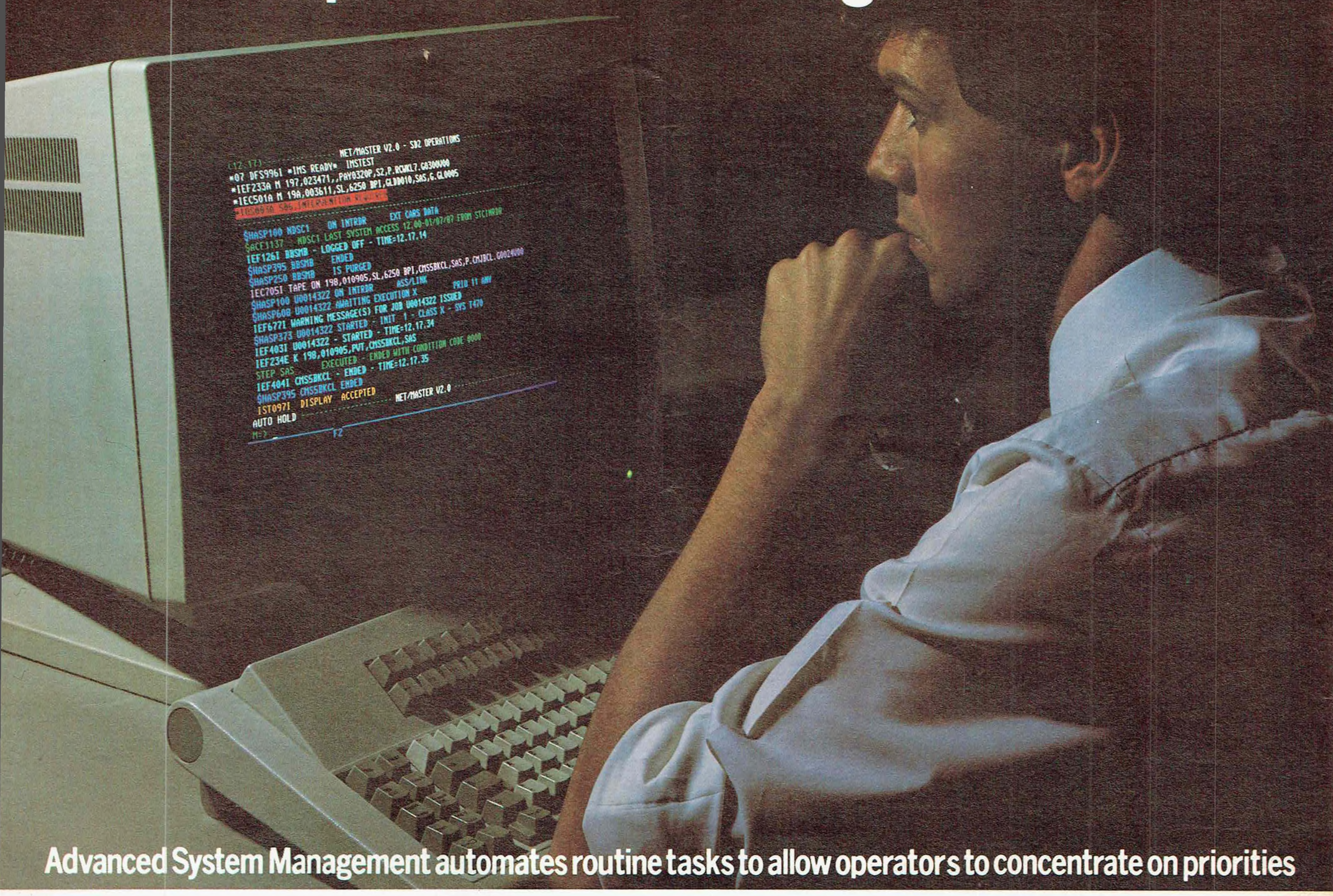

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(12.17)
*07 DFS9961 *IMS READY*  IMSTEST
*IEF233A M 197,023471,,PAY0320P,S2,P.RCWKL7.G0300V00
*IEC501A M 19A,003611,SL,6250 BPI,GLDD010,SAS,G.GL0005
*[illegible] SAS,INTERVENTION [illegible]
  $HASP100 NDSC1     ON INTRDR      EXT CARS DATA
  $ACF1137   NDSC1 LAST SYSTEM ACCESS 12.00-01/07/87 FROM STCINRDR
  IEF126I BBSMB - LOGGED OFF - TIME=12.17.14
  $HASP395 BBSMB     ENDED
  $HASP250 BBSMB     IS PURGED
  IEC705I TAPE ON 198,010905,SL,6250 BPI,CMSSBKCL,SAS,P.CMJBCL.G0024V00
  $HASP100 U0014322 ON INTRDR      ASS/LINK          PRIO 11 ANY
  $HASP608 U0014322 AWAITING EXECUTION X
  IEF677I WARNING MESSAGE(S) FOR JOB U0014322 ISSUED
  $HASP373 U0014322 STARTED - INIT  1 - CLASS X - SYS T470
  IEF403I U0014322 - STARTED - TIME=12.17.34
  IEF234E K 198,010905,PVT,CMSSBKCL,SAS
  STEP SAS        EXECUTED - ENDED WITH CONDITION CODE 0000
  IEF404I CMSSBKCL - ENDED - TIME=12.17.35
  $HASP395 CMSSBKCL ENDED
  IST097I  DISPLAY  ACCEPTED               NET/MASTER V2.0
AUTO HOLD
M=>                F2
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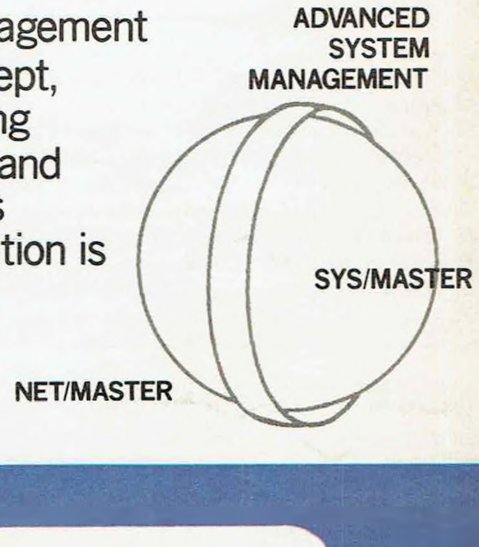

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